Volume Title: Evidences of Long Swings in Aggregate Construction Since the Civil War

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The Varieties of Statistical Indicators of Construction

This description of long swings in construction is based upon the behavior of thirty-eight series selected from a much larger number. We have tried to confine the analysis to the smallest number of series compatible with the objective of providing a fair representation of the various estimates of the volume of construction activity. A large number of series is required in order to describe the behavior of the major sectors of construction as well as that of the total. For this purpose, total construction has been divided into six sectors:

Nonfarm residential (six series)

Private nonresidential, chiefly for industrial and commercial purposes (four series)

Farm building (one series)

Transportation and other public utilities supplemented by subdivisions representing steam railroads and telegraph and telephone communications (seven series)

Building by public authorities (three series)

Shipbuilding (one series)

Some question may be raised about the inclusion of shipbuilding in this list, since ships do not share the characteristic of immobility which is often used as one of the defining qualities of the products of construction. In their long construction period, their great expense, and their durability, however, ships resemble houses, factories, and rail-

road structures; and it is interesting to see whether shipbuilding activity moves in waves of the same type as those that may be found in construction activity as usually defined.

In addition to these major branches, estimates of two classes of aggregates have been included:

Total urban building: the sum of urban residential, industrial, and commercial building, and urban building by public authorities (eight series)

Aggregate construction (eight series)

Under each of these headings, as indicated, it seemed necessary to include several series. In most sectors, the most nearly trustworthy series begin only in 1915. Because the period since that date is too short, taken by itself, to establish the existence and characteristics of long waves, it is important to supplement it with longer-term, even if less firmly based, series. Furthermore, the long-term series and, to a somewhat lesser degree, the series available since 1915, are marked by biases of various kinds and of largely unknown, but varying, importance. It is wise, therefore, to base findings on the showing of several series rather than one. This need is complicated by the problem of moving from estimates of construction measured in current values to indexes of physical volume. The price indexes that are available to correct current value figures for price changes are themselves inadequate; and in a number of cases, price-corrected value figures could be supplemented with estimates of the number of new structures built or with some other measure of volume in physical units. Even the estimates in current prices provide some additional information about the physical volume of activity to supplement the deflated value and physical unit series. Finally, the original and valuable long-term estimates of Riggleman, Long, Chawner, and Blank have been modified by later writers, for example, Isard, Colean and Newcomb, and Gottlieb, who have attempted to revise the older estimates in different ways in order to minimize the effects of their known deficiencies. There are, however, no wholly successful methods of either measuring the importance, or eliminating the influence of the biases. In a number of instances, several variant estimates of the same branch of construction or of the totals themselves have been included in the hope of seeing whether different

samples or different methods of treating the estimates derived from the same samples could seriously alter the picture of the long-swing behavior of construction or of its major branches. Accordingly, this collection of data includes series based on different kinds of underlying material, combined in different ways and expressed in several units of measurement. Permits or contract awards are the basic data underlying eighteen series; expenditures are the basis for three; materials consumed, for three; physical measures of structures produced, for three; while eleven are indexes combining series with heterogeneous bases. Viewed another way, eighteen series are estimates or indexes of value in current prices, and twenty refer to physical volumes. Of the latter, ten are series of deflated values and ten of physical units of some sort.

Although the practice of studying the behavior of several different measures of the same activity offers some degree of assurance that these findings do not rest on the peculiarities of particular samples or modes of treatment, it is, nevertheless, important to appreciate the nature of the series used and the defects to which they are subject. So as not to burden the text of this paper too heavily, however, the detailed description of these many series is given in Appendix A, which sets forth the sources and methods of construction of each of the series and attempts to identify and, to some extent, to evaluate their defects. Insofar as possible, we have tried to take account of the results of these descriptions in the survey of construction behavior presented below.